

Robust Environmental Barrier Coatings for Silicon Nitride, Phase I



Completed Technology Project (2005 - 2005)

Project Introduction

Silicon based ceramics are the leading candidates for the high temperature structural components of the advanced propulsion engines. For such applications, one key drawback of silicon based ceramics is the volatilization of the protective silica scale in engine relevant oxidizing and water vapor environments at temperatures up to 1500 degrees C. Thus for the realization of silicon based ceramic components in advanced propulsion engines, environmental and thermal protective coatings will be needed. UES, Inc. proposes to develop a multifunctional environmental barrier coating concept utilizing advanced materials, coating design and coating processing technique for low thermal expansion silicon nitride. The performance and stability of the coatings developed in this program will be determined in relevant engine environments at temperatures up to 1500 degrees C. Based upon the test results coating design and process parameters will be further refined in Phase II.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Glenn Research Center (GRC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
UES, Inc.	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Dayton, Ohio

Primary U.S. Work Locations

Ohio

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Amarendra Rai

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.1 Materials
 - └ TX12.1.5 Coatings